

REMARKS

The Office Action dated December 12, 2006, has been received and carefully noted. The Examiner is thanked for indicating the allowance of claims 1 and 2. The following remarks, are submitted as a full and complete response thereto.

Claims 1-3 are pending, of which claims 1 and 3 are independent.

Claim 3 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Ohsuga et al. (U.S. Patent No. 5,117,795 – hereinafter Ohsuga) in view of Gorille et al. (GB 2070782 – hereinafter Gorille). This rejection is respectfully traversed because Ohsuga and Gorille, in combination or separately, fail to teach, disclose, or suggest all of the features of claim 3 of the present invention.

Applicant's claimed invention, as recited in claim 3, is directed to a control unit for an internal combustion engine. The control unit detects, using a sensor that is located on a downstream side of a throttle valve on an air intake passage of an internal combustion engine, a flow rate of air that is taken into the internal combustion engine; calculates an injection quantity of fuel based on this air flow rate; and outputs a signal to an injector of the internal combustion engine such that this injection quantity of fuel is injected, wherein an integral value of the air flow rate that increases as an intake stroke of the internal combustion engine progresses is calculated until the air intake ends, and during a period from the start of the air intake until the end of the air intake, an injection quantity of fuel is determined based upon the integral value at regular predetermined

times, and a signal is output to the injector such that the injection quantity matches an accumulated value from the start of the air intake.

In the rejection, the Office Action contended that Ohsuga discloses a fuel injection control system having an airflow sensor 3 downstream of a throttle valve. However, the Office Action recognized an integral value of airflow is not used for fuel calculation. To cure the deficiency of Ohsuga, the Office Action applied Gorille as teaching integrating an airflow signal during an intake stroke to accurately match the signal to the actual air amount. In response, Applicant respectfully asserts that there is no suggestion or motivation to combine Ohsuga and Gorille, and, even if Ohsuga and Gorille were combined, their combination would not teach, disclose or suggest all of the claimed features of claim 3.

Applicant respectfully submits that, in the rejection, the Office Action merely made a general statement regarding applicability Gorille and did not specifically and explicitly address Applicants' claimed feature of claim 3. Particularly, the Office Action failed to address the feature wherein an integral value of the air flow rate, that increases as an intake stroke of the internal combustion engine progresses, is calculated until the air intake ends, and during a period from the start of the air intake until the end of the air intake, an injection quantity of fuel is determined based on the integral value at regular predetermined time, and a signal is output to the injector such that the injection quantity matches an accumulated value from the start of the air intake as recited in claim 3.

In contrast with Applicant's claimed invention, Gorille is directed to a quasi-linearization circuit arrangement to improve the non-linear output characteristic of an air flow meter that uses hot wire air mass flow meter. In one embodiment, as shown in Fig. 1a of Gorille, a quasi-linearization circuit arrangement 14a and an integrator 15a is used. In another embodiment of Gorille, as shown in Fig. 1b, a non-linear voltage-frequency converter 14b for linearizing a non-linear hot wire output characteristic and a counter 15b are used. However, although Gorille discusses integrating the signal from the air flow meter in the first embodiment, as shown in Fig. 1a, and controlling fuel injection using the integrated signal and the engine speed signal from an engine speed sensor 10, there appears to be no description or suggestion pertaining to the cycle of the integral calculation and how an injection quantity of fuel is determined. Moreover, Gorille does not appear to discuss any accumulated value of the injection quantity and matching of a signal output to the injection quantity.

Further, according to page 2, lines 25-27, of Gorille, it is stated that the integration limits of the integrator 15a in the first embodiment, and the counting limits of the counter 15b in the second embodiment, are determined by signals from the engine speed meter 10. Hence, based on the limited details in Gorille regarding how the quantity of injected fuel is actually determined, Applicant respectfully asserts that one cannot conclude that Gorille teaches or suggests Applicants' above-mentioned features of claim 3.

Still further, even though Ohsuga describes an arrangement wherein an air mass flow meter is downstream of a throttle valve, there is no proper motivation or suggestion

to incorporate an integrator of Gorille with the air-fuel mixture apparatus of Ohsuga to arrive at Applicants' claimed invention.

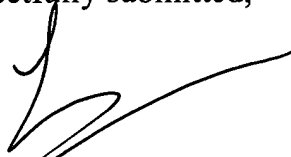
As discussed above, Ohsuga and Gorille, in combination or separately, fail to teach, disclose, or suggest all of Applicant's claimed features as recited in the pending claim 3. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the pending obviousness rejection over claim 3.

In view of the above, Applicants respectfully submit that each of the claims 1-3 recites subject matter which neither disclosed nor suggested in the cited reference to Ohsuga and Gorille. It is therefore respectfully requested that these pending rejections be withdrawn, and this application pass to issue with the allowance of pending claims 1-3.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



Luan C. Do
Registration No. 38,434

Customer No. 32294
SQUIRE, SANDERS & DEMPSEY LLP
14TH Floor
8000 Towers Crescent Drive
Tysons Corner, Virginia 22182-2700
Telephone: 703-720-7800
Fax: 703-720-7802

LCD:kzw